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This Technical Service Bulletin describes service procedures for Axle Shaft Service on 1999-2004 Ford Super Duty F250, F350, F450, and F550 4x4 trucks. This TSB also covers axle shaft to knuckle seal replacement which is required anytime the front axle shafts are removed. See TSB491 for Ball Joint Service, TSB4594 for Front Hub Service, and TSB4643 for Inner Axle Seal Replacement (order from 4x4repairmanuals.com). Special front axle service tools for your Ford Super Duty can be found at www.4x4tools.com. (See tool note on page 4.)

# 1999-2004 4x4 Ford Super Duty Axle Shaft Service

## Disassembly

1. **ALWAYS WEAR EYE PROTECTION!** (see safety note page 4)
2. Raise and safely support vehicle.
3. Remove front tire and wheel assemblies.
4. Remove brake calipers and wire to frame. DO NOT LET CALIPERS HANG FROM HOSES!
5. Optional but recommended to prevent oil seepage into axle tubes: Remove front differential cover and drain oil.
6. Remove brake pads and brake caliper supports.
7. Dual rear wheel vehicles: Remove hub extenders.
8. Remove brake rotor (should slip off).
9. Compress and remove snap ring retaining lockout hub in wheel hub.
10. Remove lockout hub. Once the snap ring is removed, you SHOULD be able to work the lockout hub out of the wheel hub. If the lockout hub will not slide out, use T1124 Hub Remover and a slide hammer to pull the lockout hub out of the wheel hub (*figure 1*).
11. Remove snap ring and 3 thrust washers from axle shaft.
12. On anti-lock brake equipped models, disconnect the connector by the frame and disengage the harness clips.
13. Remove four locknuts from inside knuckle that retain the wheel hub assembly to the knuckle.
14. Pull the hub out of the knuckle. The hub is designed to be a slip fit and it should be easily removed. If the hub will not separate from the knuckle, you may need to use a puller *(figure 2)*. The brake shield should come off with the hub.
15. Remove inner thrust washer from axle shaft *(figure 3)*.
16. Remove the axle shaft by either pulling it out with the T1123 Axle Shaft Puller and a slide hammer *(figure 4)*, or use a brass punch to drive the axle shaft and seal from the knuckle. (Yes, the seal gets wrecked.)



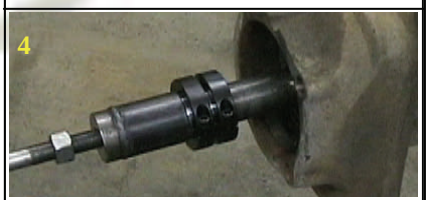
Removing a stuck Stock Lockout Hub with T1124 Puller and QT9302 Slide Hammer



Pulling a stuck wheel hub with T1039A Hub Puller, T1146 Adapter Set, and T9303 10 lb. Slide Hammer



Removing Inner Thrust Washer



Using T1123 Axle Shaft Puller and QT9302 5 lb. Slide Hammer

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## Axle Universal Joint Replacement

1. Remove C-Clips from cups *(figure 5).*
2. Press out cups from yoke. The preferred method is to use a T1065 C-Frame Press, T4009 Press Yoke, and T4015 Anvil *(figure 6).* If a press is not available, you can often remove the cups by supporting one yoke in a vise and striking downward on the unsupported yoke with a hammer. Repeat for other 3 cups. *Tech Tip: Pressing on one cup to force the opposite cup out may lead to excessive force being applied to the yoke ears (figure 7).*



Shaft Wrecked During Disassembly by Applying Too Much Force on Opposite Cup

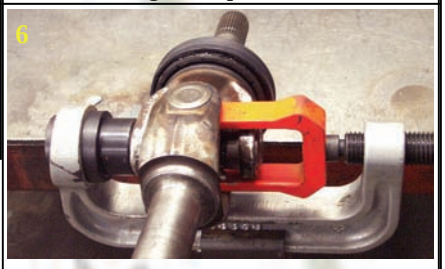
3. File burrs and rust from axle shaft flats where snap ring seats *(figure 8).*
4. Remove any burrs from inside yoke holes *(figure 9).* Burrs will damage the seals on your new universal joints.
5. Thoroughly clean the axle shafts with a suitable solvent.
6. **Greaseable Joints Only**: Put a shot of grease in each new u-joint cap.
7. Install u-joint cross in outer axle shaft, press in caps *(figure 10)* and install snap rings *(Figure 11).* Make sure rings are fully seated in grooves. *Tech Tip: Greaseable Joints: Lube fitting should angle towards inner shaft.*
8. Repeat operation on inner axle shaft. Press T1065, Tip T4011, and Anvil T4015 are recommended.
9. Seat cups by supporting one axle shaft yoke over vise jaws *(figure 12).* Strike opposite yoke with hammer to drive yoke against snap ring. Repeat for all four cups.
10. **Greaseable Joints Only**: Install grease fitting and lubricate joint with quality grease meeting NLGI specification LB or GC-LB.

## Axle Shaft Seal Service

1. Drive or press the knuckle seal from the outer axle shaft (*figure 13).*
2. Drive the outboard axle tube seal from the inner axle shaft. *Tech Tip: The outboard tube seal keeps dust and dirt from entering the axle tubes. It is not an oil seal. If oil is leaking from the axle tubes, you will need to replace the inner axle seals next to the differential. See TSB4643 for Super Duty Inner Axle Seal Replacement procedures.*
3. Clean the axle shafts.
4. Install new knuckle seals to the correct depth on the outer axle shafts with the T1515 Seal Installer by pressing or driving the seal on until the Installer bottoms against the axle



Removing C-Clip From U-Joint

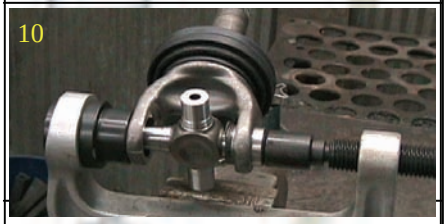


U-joint Removal using T1065 C-Frame Press and T4009 Press Yoke





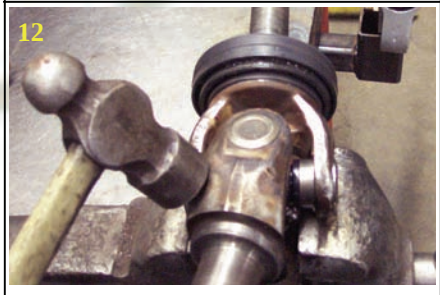
File Burrs From Yokes



Pressing Cup in Yoke



Installing Snap Ring



Seating Snap Ring

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shaft face *(figures 14, 15).* Damage free installation of these seals to the correct depth on both the axle shaft and into the knuckle is critical for satisfactory service.

5. Install new outboard tube seals on the inner shafts. The seals do not fit very tight and can usually be pushed into position on the axle shafts. Push seal down until flange is against inner axle shaft yoke *(figure 16).*
6. Apply a thin, uniform coat of Lithium Long Life or Exxon Ronex grease to the inner axle shaft dust seal lip that contacts the axle shaft tube to prevent squeaks and premature seal wear *(Arrow, figure 16).*

## Reassembly

1. Clean the knuckle, hub, axle shaft needle bearing in hub, brake parts, etc.. Replace the axle shaft bearing(s) if damage or rust is evident.
2. Remove any rust or scale from the hub and brake rotor mating surfaces.
3. Install differential cover if removed. Allow at least 1 hour for RTV to cure before adding oil. Torque cover bolts to 35 lb/ft (47 Nm) in a criss-cross pattern. *Tech Tip: Do not fill differential until after axle shafts are installed.*
4. Lightly coat the outer diameter of the knuckle seal with clean oil *(figure 17).*
5. Install the axle shaft/knuckle seal into the knuckle with the T1515 Installer. Drive the shaft in until the Installer flange stops against the knuckle *(figure 18).*
6. Liberally coat the outer axle shaft and large plastic thrust washer with clean grease. Slide the thrust washer onto the axle shaft with the chamfer against the shaft.
7. Lubricate the small axle shaft needle bearing inside the hub with clean grease.
8. Install new o-rings on the lockout hubs and wheel hubs.
9. Apply a film of grease meeting Ford specification ESA-M1C198-A to the wheel hub o-ring and the outside diameter of the hub where it will contact the knuckle.
10. Assemble the brake shield to the hub and install the assembly into the knuckle.
11. Apply 242 Threadlocker to the hub retaining nuts. Install the four nuts and tighten in a criss-cross pattern to 133 lb/ft (180 Nm). *(Ford Factory Workshop Manuals through 2004 have a discrepancy in torque values for the hub to knuckle nuts. In the service section, the torque value given is 133 lb/ft (180 Nm). The torque tables specify only 55 lb/ft (74 Nm) for front hub and bearing-to-knuckle nuts. Ford corrected the table specification in the 2005 manual.)*
12. Lubricate the three axle shaft thrust washers with clean grease and install them on the axle shaft in this order:

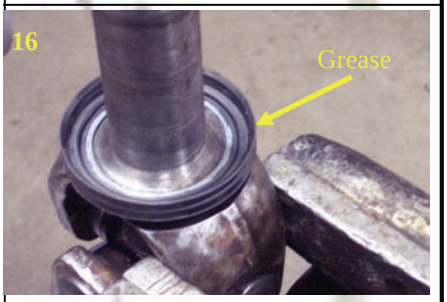


Removing Knuckle Seal





Press or drive new knuckle seals onto the outer axle shafts using T1515 Knuckle Seal Installer.



Axle Seal on Inner Axle Shaft



Oiling Outside of Knuckle Seal



Seating Axle Shaft in Knuckle

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metal, plastic, metal. Install the axle shaft snap ring.

13. On ABS equipped models, apply some dielectric grease to the connectors, then connect the wire harness and attach the retaining clips.
14. Apply a film of clean grease the lockout hub splines and install the lockout hub assemblies.
15. Apply a thin coating of anti-seize compound to the hub to brake rotor mating surface, making sure you do not get any anti-seize on the wheel studs or rotor friction surfaces.
16. Install the rotor to the hub.
17. Apply 242 Threadlocker to the caliper support bolts. Install the caliper supports. Torque the bolts to 166 lb/ft (225 Nm) for F250, F350 models; and 295 lb/ft (400 Nm) for F450, F550, and motorhome chassis.
18. Lubricate the sliding brake caliper pins and boots with Disc Brake Lube.
19. Install the brake pads, calipers, and anti-rattle hardware. Apply 242 Threadlocker to the caliper bolt threads. Install and torque the bolts to 42 lb/ft (56 Nm).
20. On dual wheel models, install the hub extensions. Torque the nuts to 130 lb/ft (176 Nm) in a criss-cross pattern.
21. Install tire & wheel assemblies. Torque nuts to the specification listed in your owners manual.
22. Make sure differential is filled with oil.
23. Check brake operation and road test.

| 1999-2004 Ford Super Duty Front Axle Torque Specifications | | | |
|---|---|---|---|
| **Fastener** | **Wrench Size** | **Torque (ft/lb)** | **Torque (Nm)** |
| Hub to Knuckle Bolts | 21mm | 133 | 180 |
| Brake Caliper Support (F250, F350) | 21mm | 166 | 225 |
| Brake Caliper Support (F350, F450) | | 295 | 400 |
| Brake Caliper | | 42 | 56 |
| **Differential Oil Specification** | SAE 90 Premium Rear Axle Lubricant ESW-M2C105-A | | |

*T Prefix Super Duty Axle Service Tools Are Available From:
the **www.4x4tools.com** *Ford Super Duty Tools* Web Page

*Front Axle Parts and QT Prefix Super Duty Service Tools Are Available From:
**www.quad4x4.com**




This Tech Service Bulletin is intended as an aide to performing a specific service procedure. It is not a replacement for vehicle manufactures or other service manuals.

Working on vehicles is dangerous. It has certain inherent risks, including serious bodily injury and death. This tech service bulletin is not a substitute for common sense, experience and careful preparation. You are responsible for taking appropriate safety precautions before and during working on your vehicle or vehicle components. If you do not already know how to safely work on your vehicle, please have the work done by a professional automotive technician. !!!!!!!!!!!!!!!!!!!!!!!!!!!!

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